

REMARKS

Claims 1–18 are pending in this application. Claims 1, 2, 4, 5, 9–13, 17 and 18 have been amended.

The claims stand rejected for being indefinite for failing to particularly point out and distinctly claim the subject matter that is regarded as the invention, as anticipated by U.S. Patent No. 5,399,184 to Harada (hereinafter the '184 patent), and/or as being obvious in light of Harada and U.S. Patent No. 5,338,412 to Burk et al. (hereinafter the '412 patent) The individual rejections will be addressed below in the order presented in the outstanding Office Action.

Support for Claim Amendments

The amendments presented above have been made to recite particular features of the inventions so as to expedite the prosecution of the present application to allowance in accordance with the USPTO Patent Business Goals (65 Fed. Reg. 54603, September 8, 2000). These amendments do not represent an acquiescence or agreement with any of the outstanding rejections.

Claims 1 and 11 have been amended to recite: "...unit cell comprising both an anion exchange membrane and a cation exchange membrane having catalyst layers on both sides thereof, sandwiched between an electrode for fuel gas and an electrode for oxidizing gas..." This recitation has support in paragraphs 30 and 46 of the Specification. In addition, claims 1 and 11 have been amended to recite: "...interconnectors having a gas channel which are disposed outside of the gas diffusion layers and serve as current carriers." This recitation has support in paragraph 37 of the Specification. These amendments to the instant claims more clearly define the present invention.

I. Claim Objections

Claims 1 and 11 are objected to because of informalities. Claims 1 and 11 have been amended to recite "the outside of each of the electrodes" to provide proper antecedent basis so as to have a better understanding of the instant claims.

II. Claim Rejections-35 USC § 112

Claims 1–18 stand rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

Claims 1 and 11 recite the limitation “the catalysts” in lines 7 and 6 respectively. Claims 1 and 11 have been amended to recite “catalyst layers” which provides antecedent basis for the recitation in amended claims 1 and 11.

Claim 2 recites the limitation “the gas passage” in lines 1–2. Claim 2 has been amended to recite “the interconnectors” to provide antecedent basis for this limitation in the claim. The recitation “a portion of the gas diffusion layer” in lines 3 and 4–5 has been amended to recite “the portion of the gas diffusion layers” in order to provide antecedent basis for this limitation in the claim.

Claims 4, 5, 12 and 13 contain trademark/trade name “Tosflex” and “Nafion.” Claims 4 and 12 have been amended to recite: “comprises a perfluorinated anion exchange membrane;” claims 5 and 13 have been amended to recite: “comprises a perfluorinated cation exchange membrane.” These amendments have been entered in order to eliminate the use of trademarks/trade names.

Claims 9 and 17 have been amended to recite: “wherein the plurality of unit cells of said fuel cell are stacked one after another such that the anion exchange membranes and the cation exchange membranes of the fuel cell are alternately disposed on the same plane.” Claims 10 and 18 have been amended to remove the description “plurality.” The amendments have been made to the instant claims to provide antecedent basis for the recitations in claims 10 and 18.

In view of the forgoing, Applicants submit that claims 1–18 satisfy the requirements of 35 U.S.C § 112, second paragraph and respectfully request that the rejections on this basis be withdrawn.

III. Claim Rejections-35 USC § 102

Claims 1–3, 5–11 and 13–18 stand rejected under 35 USC 102(b) as being anticipated by the ’184 patent to Harada. The Examiner states: “The instant claims are directed to solid polymer fuel cells wherein the claimed inventive concept comprises the specific exchange material employed therein. Other limitations include gas

passages; the polymer materials; the carbon paper; and membrane positioning.”
(Section 11 of the Office Action, Page 4, second paragraph).

Harada proposes “a method for fabricating an electrode assembly for solid polymer electrolyte fuel cells comprising a cation exchange membrane as the electrolyte and electrode catalyst layers, which use specific perfluorosulfonic acid copolymers of the cation exchange membrane and a binder used for preparing the electrode catalyst layers so as to provide an electrode assembly for the fuel cells.” (Page 4 of the Office action, third paragraph). However, the ’184 patent does not disclose the use of both cation exchange and anion exchange membranes together in a fuel cell.

To anticipate a claim, the reference must teach every element of the claim (MPEP § 2131). *Verdegall Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) states “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” The present invention and the instant claims provide a fuel cell comprising both a cation exchange membrane and an anion exchange membrane in one cell. To this point, every element of the present invention and the instant claims are not described in the ’184 patent. The ’184 patent only discloses the use of a single type of membrane (cation exchange) in a fuel cell.

In view of the forgoing, Applicants submit that claims 1–3, 5–11 and 13–18 are not anticipated and respectfully request that the § 102(b) the rejections be withdrawn.

IV. Claim Rejections-35 USC § 103

Claims 4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the ’184 patent as applied to claims 1 and 2 and further in view of the ’412 patent to Burk et al. (Section 13 of the Office Action, Page 5).

The Examiner argues that “...it would have been obvious to one skilled in the art at the time the invention was made to use Tosflex material in the exchange membrane of Harada as Burk et al. disclose that electrochemical devices uses ion-exchange membranes made of ion exchange resins such as Tosflex...” (Section 13 of the Office Action, Page 6, third paragraph).

A basic consideration that applies to obviousness rejections that must be adhered to with respect to prior art references is that "The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination." (MPEP, § 2141). Neither the '184 patent nor the '412 patent disclose the desirability and thus the obviousness of using both cation exchange and anion exchange membranes together in a single fuel cell. Furthermore, neither of the cited references suggests effects achieved by the structure wherein both cation exchange and anion exchange membranes are used together in a fuel cell.

In view of the forgoing, Applicants submit that claims 4 and 12 are unobvious and respectfully request that the § 103(a) rejections be withdrawn.

V. Conclusions

The points and concerns raised by the Examiner in the outstanding Office Action have been addressed in full, it is respectfully submitted that this application is in condition for allowance. Should the Examiner have any remaining concerns, it is respectfully requested that the Examiner contact the undersigned Attorney to expedite the prosecution of this application to allowance.

Respectfully submitted,



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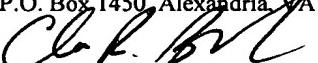


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